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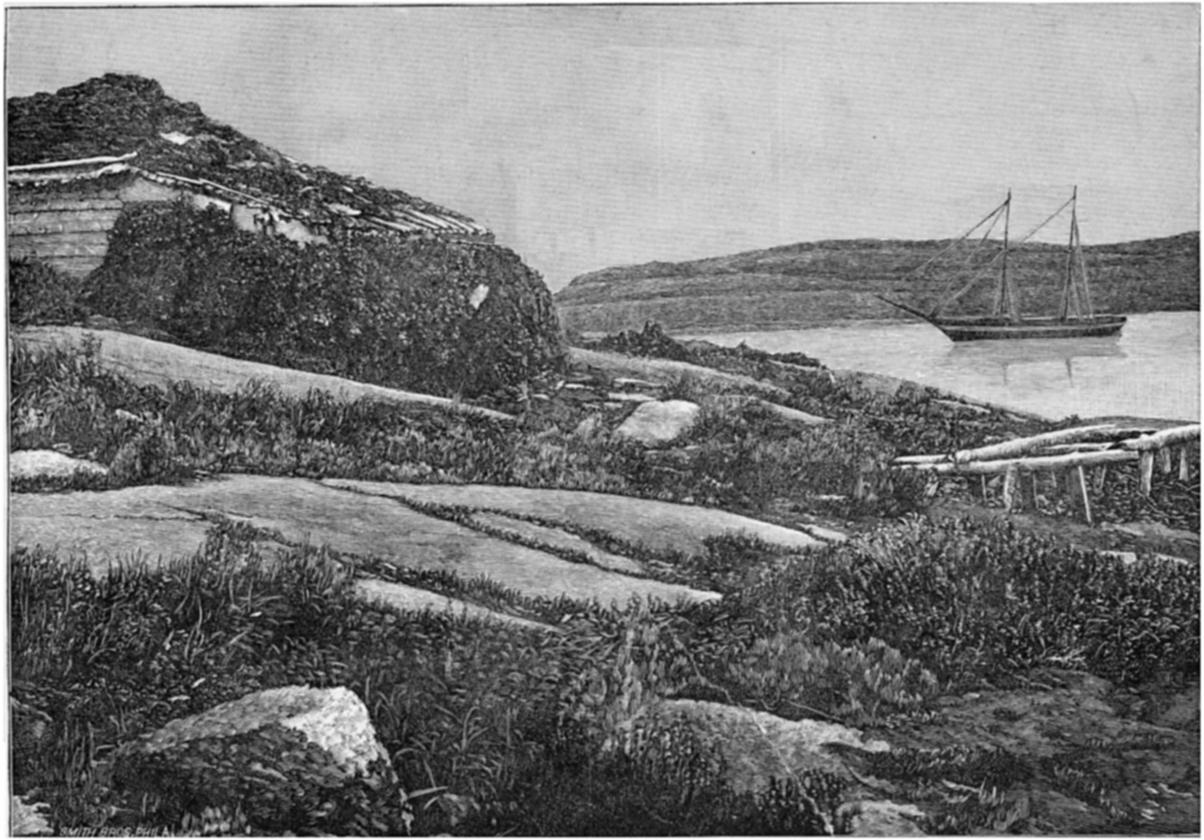
GEOLOGY AND PALÆONTOLOGY.

NOTES ON THE DRIFT NORTH OF LAKE ONTARIO, is the title of a paper read by Professor J. W. Spencer before the Phil. Soc., Washington, March 3d. This short paper is a generalized description of some of the obscure and conflicting phenomena of the drift, of which this notice is an abstract.

Amongst the deposits of the later Pleistocene period, there is a well stratified, hardened, brown clay, charged with pebbles which are more or less glaciated, resting upon the typical blue boulder clay, north of Toronto. In the Canadian classification of the Pleistocene deposits there is no place for this deposit. Indeed, all of the stratified deposits of this region need revision in the light of the progress that has been made in surface geology during the last twenty years. Thus the Saugeen clay is resolvable into three series. The relation of all the clays to the older beaches require special study, as a part of them probably represent the deep water deposits of the Beach epoch, while some of the later beaches rest upon such clays. Around the head of Georgian Bay there are ridges, in the form of moraines, similar to those about the other Great Lakes, reaching to the height of 1300 to 1400 feet above the sea. From the face of the Niagara Escarpment—between Georgian Bay and Lake Ontario—there extends, for over a hundred miles, to near Belleville, a broad zone, of from eight to twenty miles in width, covered with drift ridges, composed of stony clay below, and frequently stratified clay or sand above, having an elevation of 1100 to 1200 feet above the sea, with occasional reductions to 900 feet. These "Oak Hills or Ridges" rise from 300 to 500 feet above the Palæozoic country to the north. The stones in the clay are often glaciated limestone, with only a small proportion of crystalline pebbles or boulders. In the deposits of the ridge native copper has been found; consequently the drift-carrying agent moved southeastward down Georgian Bay, to the west end of the Oak Ridge, and probably throughout its whole length. North and east of Belleville there are many lower and fragmentary ridges, having a trend somewhat across that of the Oak Ridge. The glaciation of the region adds great difficulties to the explanation of the phenomena. The striation in the Ottawa Valley, from Lake Tamiscamang to the junction with the St. Lawrence, is to the southeastward, with very rare local exceptions. Of the Niagara escarpment, between Georgian Bay and Lake Ontario, from 1600 down to 700 feet above the sea, the striæ are also to the southeast; but between these widely separated regions the surface marking of the rocks are

PLATE III.


SMITH BROS. PHILA.

Glacial Planing in Labrador.

obscured to the west and south by drift, and to the north and east absent or rarely seen, although the crystalline rocks are commonly rounded or very rarely polished, an absence that can only in part be accounted for by subsequent atmospheric erosion. About the St. Lawrence and Lake Ontario the striations are to the southwest or west. Between the Ottawa River and Georgian Bay there is a high prominence, which divided the drift-bearing currents. But north of Lake Huron the glaciation is very strongly marked, and the direction is to the southwest, with very rare local variations.

All the lobes of glaciation about the lakes, from Superior to the Ottawa Valley, radiate backward to the broad and open but low basin of James (Hudson) Bay. The watershed between the lakes and Hudson's Bay during the epoch of the formation of the drift was several hundred feet lower than now—which is about 1600 feet at present—as shown by the differential elevation of the beaches. For this conflicting phenomena of the drift no explanation was offered, but rather sought for.

Some remarks upon the paper were offered by Mr. Gilbert, who had observed the slight amount of erosion in the Ottawa Valley; but he thought that generalized explanations of the drift were very often contradictory when applied to special regions, and that our knowledge of the phenomena would not at present give a satisfactory explanation.

GLYPTODON FROM TEXAS.—In the *Proceedings* of the Philosophical Society for 1884, p. 2, I recorded the discovery of a species of Glyptodon in the valley of Mexico by Professor Castillo, which was at the time the most northern locality at which the genus had been discovered. I can now announce its discovery within the limits of the United States, in Nueces Co., Southern Texas, by my friend, Mr. William Taylor, in the beds which have yielded *Equus crenidens* Cope and *E. barcenæi* Cope, both species of the valley of Mexico.

The present species is represented but by a single segment of the with shallow grooves, which issue abruptly near the median border and radiate towards, and some of them to, the circumference, becoming shallowed externally; no tuberosities. Diameter of scutum, 45 mm.; of median area, 17 mm.; thickness, 15 mm. This species is of the same type as that one found in the valley of Mexico, but I cannot speak positively as to its identity. It may be called *Glyptodon petaliferus.*—*E. D. Cope.*

GENERAL.—According to A. W. Stelzner, the Archæan rocks, primitive gneiss, and primitive slates compose the greater part of the sierras which rise out of the Pampas; but granite occurs in most of these sierras, especially in that of Achala. This granite must certainly be pre-Silurian. The principal locality of the Silurian rocks is in the Anti-Cordilleras. Devonian and Carboniferous rocks have not hitherto been found in the Republic, but, possibly, the Carboniferous strata of Southern Brazil and Uruguay may extend into the Province of Corrientes. The Dyas and Trias have, also, not been palæontologically identified. The red sandstone which D'Orbigny believed to be Triassic has been since referred to the Upper Jurassic or to the Cretaceous. Rhætic beds have been found near Mendoza and in the Famatina Mountain, etc. Jurassic beds are exposed in the Espinazito Mountains, and a Jurassic sea extended from the eastern coast far into the interior. The gypsum-bearing sandstone of the passes of Patos and Cumbre belong to the Cretaceous formation, as do also the red sandstone of the Province of Tucuman and that of Jujuy.

PALÆOZOIC.—Hans Reusch (Sep.-Abd. a. d. neu. Jahrbuch für Min., Geol. u. Pal.) describes the geology of a metamorphosed district on the Hardangerfjord, in Norway. The region treated of is on the west coast of Norway, south of Bergen. The foldings of the strata (as shown in the wood-cuts) are most singular. Granite rocks show laminations, are set with blocks of gneiss, or are twisted in inextricable confusion; conglomerates are so compressed that the pebbles form narrow lines; granite forms dykes in diorite, and the whole region is a maze of conflicting strikes and dips.

CÆNOZOIC.—The ninth volume of the Bulletin of the National Academy of Sciences of Cordoba (Argentine Republic) contains descriptions of numerous mammalian fossils from the Tertiary strata near the Parana. Among these are *Cynonasua argentina*, a form allied to the coati, but with seven molars in the lower jaw; a Canis, of about the size of *C. azaræ;* a catlike animal, for which Ameghini forms the genus Apera, and which appears to have been about twice the size of the domestic cat; six species of the rodent genus Megamys,—one of them of almost gigantic size; *Epiblema horridula,* a rodent a little larger than the viscachia; two or three species of the new genus Tetrastylus; two each of Morenia and Orthomys; *Myopotamus paranensis; Plexochœrus paranensis*, previously described as a Hydrochœrus, but differing from that genus in the structure of the last molar; two forms of the new genus Cardiatherium, etc., etc. Many already known species and genera—such as Toxodon, Paradoxomys, etc.—receive additional elucidation in this text. *Macrauchenia bravardi* and *M. rothii* are separated, under the generic name of Scalabrinitherium; while *Oxyodontherium zeballosi* is equivalent to the *M. minuta* of Burmeister. *Promegatherium remalsumis*, a sloth-like animal, nearly as large as *Megatherium americanum;* and *Pseudolestodon æqualis* is another huge sloth. *Comaphoras concisus* and *Proëuphractus limpidus* are among the new loricate edentates. Remains of Cetacea are abundant in marine beds which overlie the fresh-water strata.

PLEISTOCENE.—Dr. Alfredo Dugès describes in a recent number of *La Naturaleza* a Pleistocene fossil, which he names *Platygonus alemanii.* The skeleton appeared to be complete, but was in great part destroyed during the excavation. The animal was almost double the size of the modern peccary.

MINERALOGY AND PETROGRAPHY.[1]

PETROGRAPHICAL NEWS.—The very interesting paper by Brauno[2] on the palæopicrite of Amelose, near Biedenkopf in Hessen Nassau, contains a full description of this rock and its numerous alterative products. The freshest type of the palæopicrite is composed of idiomorphic olivine, augite, both idiomorphic and allotriomorphic, irregular grains of plagioclose, picotite and magnetite. The augite often shows the unusual alteration into biotite. The principal alteration products of the rock are serpentine, siliciophite, chrysolite, metaxite, picrolite, webskyite,[3] calcite and quartz. The three substances chrysolite, metaxite and picrolite are studied in great detail, and their optical and physical properties are described at length. The author regards them each as a variety of serpentine, the first consisting of slender elastic fibres, the second of coarse stiff needles, and the third being characterized by a radiating structure.

The serpentines, amphibolites and eclogites from the neighborhood of Marienbad, in Bohemia, were formerly regarded as sedimentary beds which had been metamorphosed by the action of granite, which occurs near them in a boss. Patton has recently examined these rocks very carefully. He considers[4] them as prob-

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[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Maine.

[2] Neues Jahrb. f. Min., etc., B. B. v., p. 276.

[3] American Naturalist, Nov., 1887, p. 1021.

[4] Min. u. Petrog. Mitth., 1887, ix., p. 89.